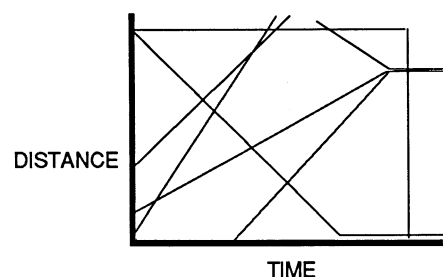


## Tell me a story (Post Primary)

This group activity revolves around a graph which models cars travelling on a road.

There are lots of opportunities for creative interpretation, for talking and sharing, for story telling, and for creative presentation of findings through writing or acting.

Compare this to the typical textbook approach where pupils work individually on a series of one-dimensional exercises. The activity is a powerful illustration of a quite different teaching approach to this topic.



### Features of this activity

- The capacity of a graph to model a real situation.
- Groups creatively prepare and present hypothetical stories based on a graph.
- The approach used encourages girls' participation.
- An application of linear graphs.
- The lesson uses group discussion to a large extent.
- Creative group reporting, including verbalisation of mathematical observations.

### Preparation

Each pupil needs a copy of the worksheet on page 256.

### Comments from trials schools

*'It was entertaining for kids and allowed them to be creative.'*

*'It was a pleasant change from their usual lessons — it made a number of good points in a fun situation.'*

*'A terrific way to end the topic.'*



*Pupils act out the happenings of the blue car.*

The graph used in this activity is taken from M. Swan (1985), *Traffic — an approach to distance-time graphs*, *The Language of Education and Graphs*. Nottingham: Joint Matriculation Board and Shell Centre for Mathematical Education, and is reprinted with kind permission.



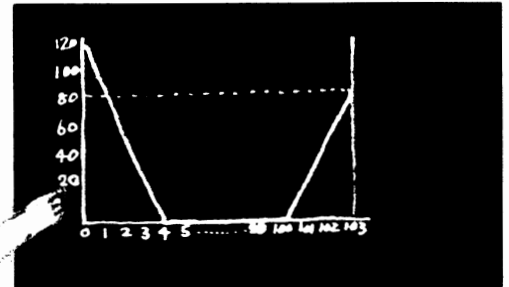
## Tell me a story (Post primary)

After a teacher demonstration of method, a graph with many lines representing cars at a particular part of a road, and at a particular time is distributed. Working in groups, pupils discover many things happening, and are asked to tell the story of one of the cars and what a passenger in that car might have seen and done. The approach used in this activity encourages girls to be involved in a context which is usually oriented to boys (i.e. cars).

A GRAPH CAN TELL YOU A 'STORY' ABOUT AN EVENT.  
THE MATHEMATICS OF THE GRAPH CONTAINS INFORMATION ABOUT THE REALITY OF SOME SITUATION

### 1. Introduction

HERE'S A TELEPHONE BOX BESIDE A ROAD.  
AND THIS GRAPH REPRESENTS A CAR COMING UP TO THE TELEPHONE BOX



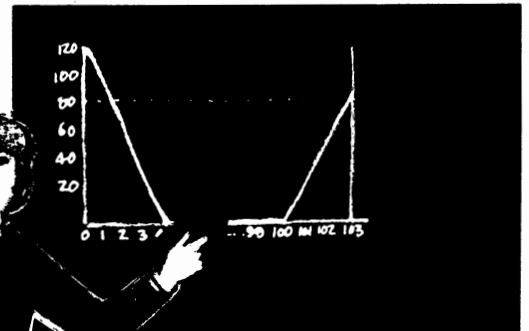
No deceleration or acceleration is incorporated in the graphs. No direction is necessarily implied.

TEACHER-LED DISCUSSION (MAXIMUM 5-10 MINUTES.)

### 2. What can this graph tell us about the movements of the car?

Bring out concepts of direction, distance, time and speed.

THE CAR STARTS OUT 120 METRES FROM THE TELEPHONE BOX — IT ARRIVES FOUR SECONDS LATER, TRAVELLING AT 30 METRES PER SECOND. AFTER NINETY-SIX SECONDS (MAYBE MAKING A PHONE CALL) THE DRIVER LEAVES AT A SLOWER SPEED OF 20 METRES PER SECOND



Since group work is an important part of the lesson, it is worth emphasising this to pupils.

Structuring group discussion rather than pen and paper questions, allows for open-ended discussion, creative thinking and writing, use of pupils' own language and experiences in car travel. This is particularly valuable for girls.

### 3. Group discussion

Organise the class into groups of four or five pupils. Hand out copies of the worksheet.

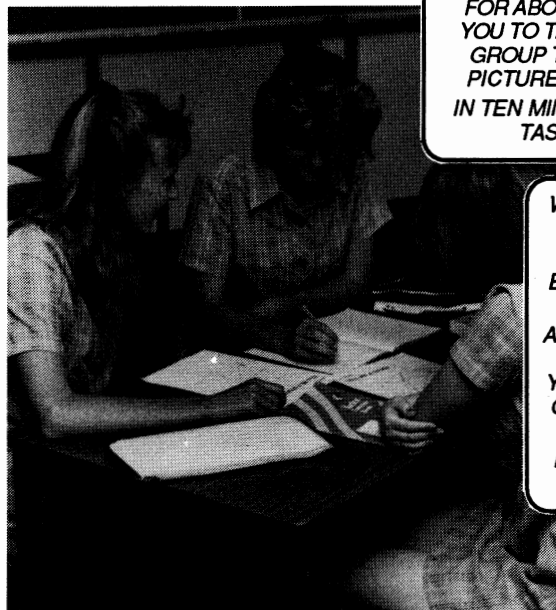
YOU'VE JUST ANALYSED ONE CAR AND ITS MOTION — HERE IS A SITUATION WITH SEVERAL CARS

FOR ABOUT TEN MINUTES I WANT YOU TO TALK TO OTHERS IN YOUR GROUP TO TRY TO GET A CLEAR PICTURE OF WHAT IS GOING ON. IN TEN MINUTES I WILL BE GIVING A TASK TO EACH GROUP

The teacher's role during the group discussions.

- Visit each group.
- Encourage pupils to talk about what they can 'see' in the graph.
- Help pupils 'read' such things as speed, cars passing each other, and so on.
- Remind pupils of future tasks.
- Sow the seeds of creative interpretation.

Pupils become increasingly willing to ascribe 'reasons' for the green car travelling three times faster than the 'putt-putt' blue car.



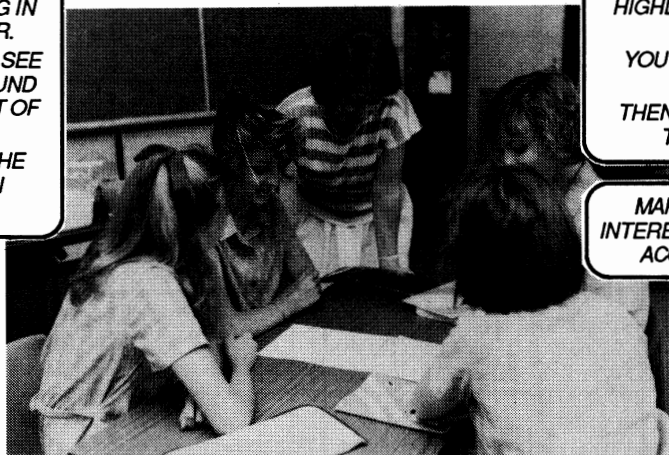
WHY HAVE I PUT YOU INTO GROUPS?  
WELL FIRSTLY, SEVERAL BRAINS ARE BETTER THAN ONE!  
AS WELL I WANT YOU TO BE ABLE TO EXPLAIN WHAT YOU SEE IN THE GRAPH TO OTHERS IN YOUR GROUP.  
IT'S NOT MUCH GOOD KNOWING THINGS IF YOU CAN'T EXPLAIN THEM!



#### 4. Tasks for each group

After ten minutes, allot a car to each group in the class.

YOUR GROUP ARE ALL TRAVELLING IN THE BLUE CAR. WHAT CAN YOU SEE GOING ON AROUND YOU ... IN FRONT OF THE CAR? ... THROUGH THE REAR VISION MIRRORS?



PREPARE A GROUP REPORT GIVING THE HIGHLIGHTS OF YOUR TRIP FOR THESE FOURTEEN SECONDS. YOU HAVE TEN MINUTES TO PREPARE THE REPORT. THEN EACH GROUP WILL HAVE ABOUT TWO MINUTES TO PRESENT IT

MAKE THEM INTERESTING, BUT ACCURATE

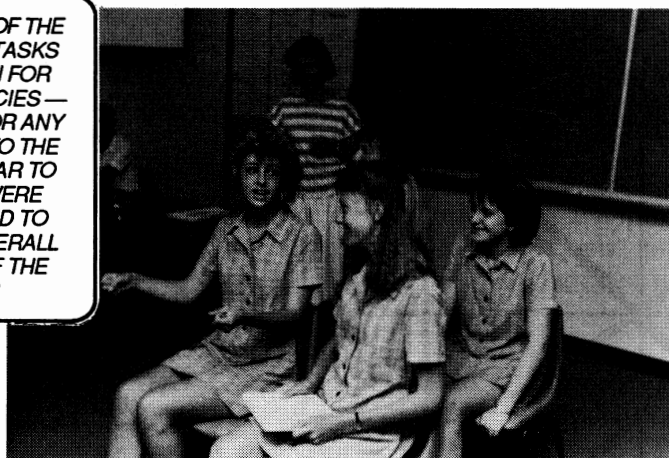
A sample report could be simulated by the teacher. Such a report could highlight possibilities but should not stifle creativity. Make sure there is enough time for the reports — ten or fifteen minutes for reporting should suffice.

#### 5. Group reports

From your visit to each group, you can make a judicious decision on which group to invite to present the first report.

There is probably no need for every group to present a report. Some will be enthusiastic to do so, but after three reports, remaining groups may prefer to supply additional observations.

FOR THE REST OF THE CLASS, YOUR TASKS ARE TO LISTEN FOR ANY INACCURACIES — ESPECIALLY FOR ANY REFERENCES TO THE PARTICULAR CAR TO WHICH YOU WERE ASSIGNED, AND TO JUDGE THE OVERALL ACCURACY OF THE REPORTS



While pupils are preparing reports the teacher should visit each group to:

- ensure that ideas are being recorded,
- encourage a balance between creativity and mathematical accuracy,
- stimulate ideas if discussion is slowing down, and encourage all members of the group to share in the presentation, rather than leave it to one spokesperson.

The assessment used here is informal and non-threatening as the teacher encourages tactful appraisal of the strengths (and any weaknesses of each report).

Non-competitive assessment allows many girls to feel more comfortable, particularly when considering the subject matter.

#### Extensions

- One school reported some keen pupils producing a computer-graphics picture of the cars in motion.
- Interested groups may like to create another graph, or extend the worksheet graph.

#### Sample reports

- a. Pupils presented the report with their chairs arranged to simulate car seats. Each pupil contributed comments.

*'We left the telephone box and jumped into our green Ferrari and raced off towards home at 36 metres per second (108 km/h).*

*That blue car twenty metres ahead of us is going pretty slowly!'*

*Time = 1. (intoned by the car microcomputer)*

*'As we passed the blue car (30 metres from the phone box) we could see an orange car up ahead, a red car parked by the side of the road, and 50 metres ahead there was this large black truck coming towards us.'*

*Time = 2.*

*'Did you see that orange car nearly sideswipe the parked car as it passed?'*

*Time = 3 and a bit.*

*'Hey, look! The red car belongs to Mr. Smith our maths teacher. He's got a flat tyre' (sympathetic mutterings) ... (The saga continues.)*

- b. Applying a different approach, one group used the chalkboard ledge and coloured pens to produce a 'puppet show' of the cars in motion.

